UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/764,072	01/19/2001	Hisham S. Abdel-Ghaffar	2925-0502P	6788

30594 7590 02/14/2008
HARNESS, DICKEY & PIERCE, P.L.C.
P.O. BOX 8910
RESTON, VA 20195

EXAMINER	
CONNOLLY, MARK A	
ART UNIT	**PAPER NUMBER**
2115	
MAIL DATE	**DELIVERY MODE**
02/14/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 09/764,072
Filing Date: January 19, 2001
Appellant(s): ABDEL-GHAFFAR, HISHAM S.

Gary D. Yacura
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 15 October 2007 appealing from the Office action mailed 2 March 2007.

1. **Real Party in Interest**

Appellant has identified the real party of interest as Alcatel-Lucent.

2. **Related Appeals and Interferences**

The summary of the related appeals and interferences in the brief is correct.

3. **Status of Claims**

The statement of the status of the claims contained in the brief is correct.

4. **Status of Amendments**

Appellant has not identified the status of any amendments after final rejection because no amendments have been made after final rejection.

5. **Summary of Claimed Subject Matter**

The summary of claimed subject matter in the brief is correct.

6. **Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement for grounds of rejection in the brief is correct.

7. **Arguments**

The statement of the grouping of the claims contained in the brief is correct.

8. **Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

9. **Evidence Relied Upon**

Premerlani, U.S. Patent 5,958,060

Thornberg U.S. Patent 5,757,772

10. **Related Proceedings Appendix**

The copy of the related proceedings is correct

11. **Grounds of Rejection**

The claim limitations correspond to features in the prior art as follows:

Claim 1	Premerlani
A method of determining a time offset estimate between a central node and a secondary node, comprising:	[Abstract]
receiving, at a central node, downlink and uplink timing information from a secondary node, the downlink and uplink timing information based on a periodic timing scale, the downlink timing information representing timing information for communication from the central node to the secondary node and the uplink information representing timing information for communication from the secondary node to the central node	[col. 5 lines 51-62 and col. 6 lines 13-24]. Terminals 1 and 2 are interpreted as central and secondary nodes respectfully. The delay between the central node and secondary node is interpreted as downlink information and the delay between the secondary node and central node is interpreted as downlink information.
converting the received downlink and uplink timing information to a continuous time scale	[col. 6 lines 20-24]. Determining both the delay between terminal 1 and terminal 2 ($T_{i-2} - T_{i-3}$) and the delay between terminal 2 and terminal 1 ($T_{i-1} - T_i$) are interpreted as

	converting the received downlink and uplink timing information to a continuous time scale.
determining only after the converting step, a time offset estimate between the central node and the secondary node based on the converted downlink and uplink timing information	Premerlani explicitly teaches that the "round trip delay can be calculated by subtracting the *delay between terminal 1 and terminal 2*… from the *delay between terminal 2 and terminal 1*" [col. 6 lines 13-24 *emphasis added*]. Because the round trip delay is calculated using the uplink and downlink times, it is inherent that the round trip delay is calculated or determined only after the individual timestamps (which are periodic) are converted into the uplink and downlink times (which are continuous). Round trip delay is interpreted as a time offset between the central and secondary nodes.

Claim 2	Premerlani
The method of claim 1, wherein the downlink information includes a first time measured at the central node of sending a downlink frame	Premerlani teaches using transmit and receive timestamps in order to calculate uplink and downlink information in order to determine the

to the secondary node and a second time measured at the secondary node of receiving the downlink frame, and the uplink information includes a third time measured at the secondary node of sending an uplink frame.	time offset between the two nodes [col. 5 lines 51-62 and col. 6 lines 13-24]. In particular, the Premerlani system begins with the central node recording a transmit timestamp T_{i-3} and sends it to the secondary node. Upon reception, the secondary node records a receive timestamp T_{i-2}. Next, the secondary node records a new transmit timestamp as T_{i-1} and sends all timestamps back to the central node.

Claim 3	Premerlani
The method of claim 2, further comprising: measuring, at the central node, a fourth time of receiving the uplink frame, and wherein the converting step converts the first, second, third and fourth times to a continuous time scale.	[col. 5 lines 51-62 and col. 6 lines 13-24]. Once the central node receives timestamps T_{i-3}, T_{i-2} and T_{i-1}, the central node records a new receive timestamp as T_{i-3} and calculates the uplink and downlink information, converting to compensate for any wrap around or roll over if necessary, in order to determine the time offset between the central and secondary node.

Claim 4	Premerlani

The method of claim 3, wherein the determining step comprises: determining uplink and downlink delay indicators based on the converted first, second, third and fourth times, and calculating the time offset estimate based on the uplink and downlink delay indicators	[col. 6 lines 13-24]. Premerlani uses the uplink and downlink delays, interpreted as converted first, second, third and fourth times, are used to calculate a round trip delay which is interpreted as a time offset.

Claim 5	Premerlani in view of Thornberg
The method of claim 4, wherein the determining uplink and downlink delay indicators step is performed for a plurality of first, second, third and fourth time sets; and the calculating step calculates the time offset estimate based on the plurality of uplink and downlink delay indicators.	Premerlani does not explicitly teach calculating a plurality of uplink and downlink times. Thornberg teaches calculating a plurality of uplink and downlink delays in order to find an average uplink and downlink delay [col. 20 lines 15-22]. It would have been obvious to one of ordinary skill in the art to realize the benefit measuring a plurality of uplink and downlink delays because as it is well known, delay times can vary between transmissions and by measuring multiple delays, a more accurate estimate of uplink and downlink

	delays can be obtained.

Claim 6	Premerlani in view of Thornberg
The method of claim 5, wherein the calculating step comprises: determining a minimum uplink delay indicator and a minimum downlink delay indicator from the plurality of uplink and downlink delay indicators; and calculating the time offset estimate based on the minimum downlink delay indicator and the minimum uplink delay indicator.	Premerlani teaches determining a minimum round trip delay, which would obviously derive from a minimum uplink and downlink delay [col. 5 lines 28-32].

Claim 7	Premerlani
The method of claim 1, further comprising: sending a downlink frame to the secondary node, the downlink frame including a first time measured at the central node indicating when the downlink frame is sent; and wherein the receiving step receives an uplink frame at the central node, the uplink frame includes the first	Premerlani teaches using transmit and receive timestamps in order to calculate uplink and downlink information in order to determine the time offset between the two nodes [col. 5 lines 51-62 and col. 6 lines 13-24]. In particular, the Premerlani system begins with the central node recording a transmit timestamp T_{i-3} and sends it

time, a second time measured at the secondary node of receiving the downlink frame, a third time measured at the secondary node of sending the uplink frame.	to the secondary node. Upon reception, the secondary node records a receive timestamp T_{i-2}. Next, the secondary node records a new transmit timestamp as T_{i-1} and sends all three timestamps back to the central node.

Claim 8	Premerlani in view of Thornberg
The method of claim 1, further comprising: setting a timer at a start of the method; and stopping the method if the timer times out.	Thornberg teaches setting a timeout period to determine if data has been lost in transmission [col. 6 lines 2-5]

Claim 9	Premerlani in view of Thornberg
The method of claim 1, further comprising: compensating the time offset estimate for DC bias errors.	Because the Premerlani-Thornberg system compensates for time offset, it is interpreted that the Premerlani-Thornberg teachings can be utilized to compensate for any time offset including those caused by DC biased errors.

Claim 10	Premerlani in view of Thornberg
The method of claim 1, wherein the central node is a radio network controller.	Thornberg teaches a cellular communications system in which a mobile device

	communicated with a radio network controller [col. 3 line 64 – col. 4 line 1, col. 3 lines 7-16 and 42-45].

Claim 11	Premerlani
A method of determining a time offset estimate between a central node and a secondary node, comprising:	[Abstract]
receiving, at a central node, downlink and uplink timing information from a secondary node, the downlink and uplink timing information based on a periodic timing scale, the downlink timing information representing timing information for communication from the central node to the secondary node and the uplink information representing timing information for communication from the secondary node to the central node	[col. 5 lines 51-62 and col. 6 lines 13-24]. Terminals 1 and 2 are interpreted as central and secondary nodes respectfully. The delay between the central node and secondary node is interpreted as downlink information and the delay between the secondary node and central node is interpreted as downlink information.
adjusting the received downlink and uplink timing information for time wraparound	[col. 6 lines 20-24]. Roll over is interpreted as wraparound.
determining only after the converting step, a	Premerlani explicitly teaches that the “round

time offset estimate between the central node and the secondary node based on the adjusted downlink and uplink timing information	trip delay can be calculated by subtracting the *delay between terminal 1 and terminal 2…* from the *delay between terminal 2 and terminal 1*" [col. 6 lines 13-24 *emphasis added*]. Because the round trip delay is calculated using the uplink and downlink times, it is inherent that the round trip delay is calculated or determined only after the individual timestamps (which are periodic) are converted into the uplink and downlink times (which are continuous). Round trip delay is interpreted as a time offset between the central and secondary nodes.
	Although Premerlani teaches performing the wraparound adjustment calculations on the round trip delay, it would have been obvious modify the Premerlani system to perform the wraparound adjustment calculations on the uplink and downlink timing information instead for the reasons set forth below in section D in the Response to Arguments.

12. **Response to Arguements**

Rejections under 35 U.S.C. 102:

Arguments under Claim 1:

A) Premerlani does not disclose converting the received downlink and uplink timing information to a continuous time scale.

The examiner disagrees with appellant's contention. As argued in the previous Examiners answer and affirmed by the Board of Patent Appeals and Interferences, even though Premerlani does not compensate for time wraparound until after an initial round trip delay is calculated, Premerlani still teaches converting received downlink and uplink timing information to a continuous time scale. In particular, Premerlani records four timestamps T_{i-3}, T_{i-2}, T_{i-1} and T_i with each timestamp representing a counter value. Because the counter can wraparound (i.e. roll over once a maximum count value is reached thus making the counter periodic), it is interpreted that the timestamps derived from the counter exists on a periodic time scale in accordance with the counter from which the timestamps are measured. Next, Premerlani teaches calculating a delay between terminals 1 and 2 and a delay between terminals 2 and 1 or in other words, a downlink and uplink delay time. Calculating the downlink and uplink delay values comprise finding a difference between the timestamp values (i.e. downlink time = $T_{i-3} - T_{i-2}$ and uplink time = $T_{i-1} - T_i$). This process converts the periodic timing information (i.e. distinct points in time represented by the timestamps) into values that represent a delay time or time duration. The examiner notes that claim 1 does not define that the downlink and uplink timing information must wraparound in order to convert the downlink and uplink timing information into a continuous time scale as is recited in allowed claim 11. Therefore, calculating a delay between

points based on a periodic scale (i.e. the downlink and uplink timing information) can be interpreted as "converting the received downlink and uplink timing information to a continuous scale" because the delay values which represent the delay between the both the downlink and uplink timing information represent a continuous time within the periodic time scale and therefore can be interpreted as existing in a continuous time scale. For example, assume the counter in Premerlani can count to 10 before wraparound. Measuring the four timestamps T_{i-3}, T_{i-2}, T_{i-1} and T_i it can be seen in Fig. 1 that each timestamp represents a value within periodic time period.

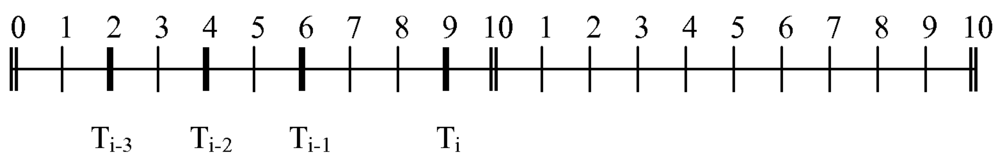

Fig. 1

Next, when calculating both the downlink and uplink times, (i.e. converted downlink and uplink timing information) the delay between the timestamps represented by Δd for the converted downlink timing information and Δu for the converted uplink timing information represents a continuous time period as can be seen in Fig. 2.

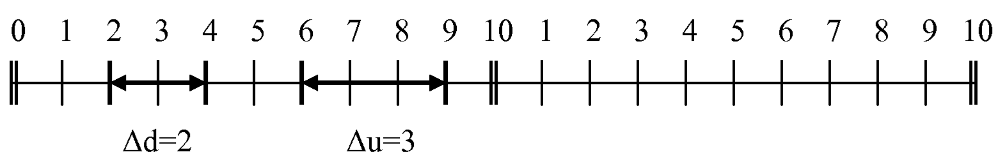

Fig. 2

Finally, both Δd and Δu are used to calculate a round trip delay herein interpreted as a time offset.

B) Premerlani does not disclose determining, only after the converting step, a time offset estimate between the central node and the secondary node based on the converted downlink and uplink timing information.

The examiner disagrees with appellant's contention. The round trip delay (RTD) is an end result indicating a time offset between two nodes. Therefore, any calculations or adjustments performed to reach the end result must be performed before the end result is actually determined.

Since the RTD calculation in Premerlani is "calculated by subtracting the delay between terminal 1 and terminal 2… from the delay between terminal 2 and terminal 1" it is clear that Premerlani converts the four timestamps (T_i - T_{i-3}) into an uplink and downlink time. As explained above, these steps convert four periodic time values into two continuous time values.

In addition, in response to appellant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., determining for time wraparound only after compensating for *time wraparound*) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Although appellant argues that Premerlani determines a time offset before adjusting for wraparound as apposed to claim 1 which adjusts for wraparound before determining the time offset, the examiner would like to point out that time wraparound is not even mentioned in the claim.

<u>Rejections under 35 U.S.C. 103</u>:

Arguments under Claims 5-6 and 8-10:

C) Claims 5-6 and 8-10 depend from independent claim 1 and are likewise allowable over Premerlani in view of Thornberg because Thornberg discloses nothing related to converting the periodic delay into a continuous time scale.

The examiner disagrees with appellant's contention. Claim 1 was rejected under 35 U.S.C. §102(b) over Premerlani and the rejection for claim 1 is proper for the reasons as given above in sections A and B.

Arguments under Claim 11:

D) It would not have been obvious in Premerlani to determine, only after adjusting for time wraparound, a time offset estimate between the central and secondary nodes based on adjusted downlink and uplink timing information.

The examiner disagrees with appellant's contention. There are well known basic and inherent algebraic concepts known as the commutative and associative properties[1]. In particular, the commutative property simply states that:

"A + B = B + A" or that:

"A + B + C = A + C + B = B + A + C = B + C + A = C + A + B = C + B + A"

In addition there is also the associative property, which simply states that:

"A + (B + C) = (A + B) + C"

In other words, both the commutative and associative properties together state that addition can be performed in any order and yield the same result. It should further be noted that subtraction statements such as "A – B" can also be rewritten as addition statements such as:

[1] these properties were further taught by Purplemath as cited in the PTO-892 dated 3/2/07.

"A + (-B) or (-B) + A"

When Premerlani calculates round trip delay, which also requires compensation for wrap around, the process occurs as follows:

1) both an uplink (UL) and downlink (DL) values are determined.

2) the UL and DL are added to determine round trip delay (RTD). In particular, UL – DL which is equivalent to UL + (-DL).

3) the RTD is compensated for wraparound (RTD') by adding and/or subtracting predetermined values from the RTD. It should be noted that wrap around can occur with *any* of the timestamps as stated by Premerlani [col. 6 lines 22-23].

These three steps can be expressed as found below in the following equations:

a) "UL = $T_{i-2} - T_{i-3}$"

b) "DL = T_{i-1} - T_i"

c) "RTD = UL + (-DL)"

d) "RTD' = RTD + X – Y" (where X and Y are values used to compensate for wraparound when Ti-3 > Ti and Ti-2 > Ti-1 respectively)

We can now determine that the final equation used to calculate round trip delay in Premerlani is equivalent to how the appellants determine time offset as claimed and argued.

Plugging back in for RTD in step d which equals UL + (-DL) as seen in step c, it should be apparent that:

"RTD' = (UL + (-DL)) + X – Y" which can be rewritten as:

"RTD' = (UL + (-DL)) + X + (–Y)"

Applying both the commutative and associative properties it is obvious that the above equation can be expressed as:

"RTD' = (UL + X) + (DL + (–Y))" or "RTD' = (UL + (-Y)) + (DL + X)"

In other words, when calculating a compensated round trip delay (RTD'), the uplink and downlink times can be adjusted for wraparound, rather than the RTD value, and still yield the same answer.

Although the reference patent does not teach the subject matter exactly as claimed, both systems operate "on basically the same principle and in the same manner" wherein the differences, in addition to being well known, "solves no stated problem and would be an obvious matter of design choice within the skill of the art" and therefore obvious variations of one another and thus not patentably distinct. See *In re Kuhle*, 188 USPQ 7 (CCPA 1975).

Additionally, it appears that the applicant has amended claim 11 to include obvious teachings solely to get around the Premerlani reference rather then amending to include novel subject matter. The specification does not explicitly point out that the claimed order is critical in determining the time offset between the central and secondary node. Although an order is shown in the specification, it is not explicitly taught that the particular order relied on by applicant is critical to the success of the invention or that the order is the only order possible to reach the correct end result. If indeed the particular order was critical in determining the time offset then it should have been identified in the specification as being so. See *Lincoln Engineering Company of Illinois* v. *Stewart-Warner Corporation*, 37 USPQ 1 (U.S. 1938).

It would have been obvious to one of ordinary skill in the art to modify the Premerlani system to calculate the time offset using adjusted uplink and downlink timing information rather

than compensating for the wrap around time by adjusting the time offset value because one of ordinary skill would understand the above algebraic knowledge and reasoning provided above and understand that both are calculations are obvious variants of one another which yield identical results.

The examiner believes that the applied references teach the claimed invention to the extent claimed and affirmation of the rejections is respectfully requested.

Mark Connolly
Examiner
Art Unit 2115

/Mark Connolly/

Primary Examiner, Art Unit 2115

Conferees:

Thomas Lee

Lynne Browne